Title: PRODUCTION OF CELLULASE, PROTEASE AND AMYLASE BY *Penicillium* sp. DURING SOLID STATE FERMENTATION OF SOY CROP RESIDUES

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Abstract:

Residues from agroindustry are potential renewable energy sources that can be employed with alternative raw materials in bioprocesses, such as solid-state fermentation (SSF) for the production of enzymes of industrial interest. The aim of this study was to evaluate the production of amylolytic, cellulolytic and proteolytic enzymes by a strain of *Penicillium sp.* LEMI A8221 during FES of soybean crop residues. The fermentation media were prepared in 250 ml Erlenmeyer flasks containing minimal mineral medium and harvesting of soy residue as the only carbon source. Inoculation of the fungus was held by the addition of plugs containing mycelium of the aforementioned strain. The fermentation took place under different pH conditions (5.0 and 6.0), temperature (30 to 35 °C) and substrate concentration (70 to 90% w/v) over 4 days, in which 24 hours intervals aliquots were taken for quantification of the three enzymes investigated. The quantification dextrinogenic amylase was performed by the iodine/iodide method, the saccharogenic amylase and CMCase were determined by the method of dinitrosalicylic acid (DNS) and protease by the method of trichloroacetic acid (TCA). The experiment was conducted in a Completely Randomized Design (CRD) with full factorial, and the results were submitted to analysis of variance (ANOVA) and regression tests. Among the fermentation conditions analyzed, the substrate concentration was the variable that influenced the production of all enzymes. The fermentation time has influenced only the saccharogenic amylase and CMCase activities, being recorded smaller values for these enzymes in the first 24 and 48 hours of fermentation, respectively. The maximum activity obtained for dextrinogenic and saccharogenic amylase, CMCase and protease were 0.20; 0.13; 0,65 and 147 $U.g^{-1}$, respectively. The isolate *Penicillium sp*. LEMI A8221 proved to be a promising biological agent with potential biotechnological applications, and the soybean residue used here might be considered an alternative source of carbon to be used in SSF.

Keywords: Bioprocesses, enzymes, biotechnological applications

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